



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,954	05/22/2006	Yuan-Yong Yan	P03096US2A (BJ001d)	9285
7590 Bridgestone Americas Holding Inc Chief Intellectual Property Counsel 1200 Firestone Parkway Akron, OH 44317-0001			EXAMINER BOYLE, ROBERT C	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 05/27/2010	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/579,954

Applicant(s)

YAN ET AL.

Examiner

ROBERT C. BOYLE

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-58 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-58 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/C)
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/1/2010 has been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action. Pending claims are claims 40-55. Claims 1-39 have been cancelled. Claims 48-55 are new.

Claim Rejections - 35 USC § 103

3. Claims 40-45, 47, 49, 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hoxmeier** (US 6,258,891) in view of **Inoue et al.** (US 6,294,624).
4. As to claim 40, Hoxmeier teaches a method of making a polymer where a living polymer, made from comonomers which include styrene (col. 2, ln. 40-41), which is an unsaturated monomer, is reacted with a cyclic siloxane and to form a living block copolymer which can be functionalized with an amino group (abstract; column 1; lines 29-67; column 2, lines 4-41; column 3, lines 10-65; column 4, lines 20-46). Hoxmeier does not teach that the amino group has an active hydrogen on the amino nitrogen atom or that the solvent is an organic solvent. It is noted that Hoxmeier teaches the reaction occurs in molten polyethylene or a non-volatile oil (col. 4, ln. 20-34) or with a solvent of cyclohexane (col. 4, ln. 20-34). Molten polyethylene is the

reaction medium (ie: solvent) and is organic, so it would have been obvious that the reaction medium is in an organic solvent. Additionally, cyclohexane is used as a solvent in Example 1 (col. 4, ln. 20-34).

5. Inoue teaches the functionalization of a diene polymer with an amine compound where the amine compound has hydrogen atoms attached to it in a benzene solvent (abstract; column 2, lines 34-60; column 3, lines 45-54; column 4, lines 36-51; column 5, lines 1-25; column 9, lines 20-67; Table 2). It would have been obvious to use the amines of Inoue with the method of Hoxmeier because Hoxmeier recites that amino compounds can be used as functional groups and Inoue teaches that amine functionalized polymers have a higher gel content, modulus elasticity, rolling resistance index and wet skid resistance index (Inoue: Table 2).

6. As to claims 41-45, Hoxmeier teaches hexamethylcyclotrisiloxane and octamethylcyclobutasiloxane (column 3, lines 10-31; column 4, lines 20-46).

7. As to claim 47, Inoue teaches water is present in the solvent (col. 9, ln. 24-26). Hoxmeier teaches polar compounds such as TMEDA (col. 3, ln. 32-40).

8. As to claim 49, Hoxmeier teaches that random copolymer blocks are included in the copolymers (col. 2, ln. 35-41) and that the blocks include comonomers of styrene (col. 2, ln. 40-41).

9. As to claim 54, Hoxmeier teaches the concentration of siloxane monomer present is from 1-80 wt% (col. 3, ln. 40-45) and the overall molecular weight of the copolymer is from 1,000 to 100,000 (col. 4, ln. 8-15). This range encompasses the embodiment where 1 wt% of siloxane monomer is used in a copolymer with a molecular weight of 1,000-40,000, resulting in polymers where the siloxane block has a molecular weight of 10-400. It is well settled that where prior art

describes the components of a claimed compound or compositions in concentrations within or overlapping the claimed concentrations a prima facie case of obviousness is established. See MPEP 2144.05; *In re Harris*, 409, F.3d 1339, 1343, 74 USPQ2d 1951, 1953 (Fed. Cir 2005); *In re Peterson*, 315 F.3d 1325, 1329, 65 USPQ 3d 1379, 1382 (Fed. Cir 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (CCPA 1990); *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974).

10. Claims 40-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hoxmeier** (US 6,258,891) in view of **Labauze** (US 5,811,479).

11. As to claim 40, Hoxmeier teaches a method of making a polymer where a living polymer, made from comonomers which include styrene (col. 2, ln. 40-41), which is an unsaturated monomer, is reacted with a cyclic siloxane and to form a living block copolymer which can be functionalized with an amino group and that the PE wax is the solvent (abstract; column 1; lines 29-67; column 2, lines 4-41; column 3, lines 10-65; column 4, lines 20-46) or with a solvent of cyclohexane (col. 4, ln. 20-34). Hoxmeier does not teach that the amino group has an active hydrogen on the amino nitrogen atom.

12. Labauze teaches functionalizing diene polymers with a cyclic siloxane followed by an amine with hydrogen atoms attached to the nitrogen atom (abstract; column 2, line 2-column 4, lines 7; column 4, line 62-column 5, line 19; column 8, line 46-column 11, line 5). It would have been obvious to use the amines of Labauze with the method of Hoxmeier because Hoxmeier recites that amino compounds can be used as functional groups and Labauze teaches the amino group gives increased hysteresis properties of the polymer (column 11, lines 1-3; Tables I-III).

13. As to claims 41-45, Hoxmeier teaches hexamethylcyclotrisiloxane and octamethylcyclobutasiloxane (column 3, lines 10-31; column 4, lines 20-46).
14. As to claim 46, Labauze teaches the 1,2 microstructure of 4-80% (col. 3, ln. 41-67). This range overlaps the claimed range.
15. As to claim 47, Hoxmeier teaches polar compounds such as TMEDA (col. 3, ln. 32-40).
16. As to claim 48, Labauze teaches living polymers of styrene-butadiene with a styrene content of 4-50 wt% (col. 3, ln. 41-67).
17. As to claim 49, Hoxmeier teaches that random copolymer blocks are included in the copolymers (col. 2, ln. 35-41) and that the blocks include comonomers of styrene (col. 2, ln. 40-41).
18. As to claims 50-52, 55-57, Labauze teaches blending the siloxane functionalized rubber with other additives including fillers, other rubbers, and vulcanizing agents (col. 6, ln. 55-col. 7, ln 22)
19. As to claims 53, 58, Labauze teaches vulcanization of the system (col. 8, ln. 5-8).
20. As to claim 54, Hoxmeier teaches the concentration of siloxane monomer present is from 1-80 wt% (col. 3, ln. 40-45) and the overall molecular weight of the copolymer is from 1,000 to 100,000 (col. 4, ln. 8-15). This range encompasses the embodiment where 1 wt% of siloxane monomer is used in a copolymer with a molecular weight of 1,000-40,000, resulting in polymers where the siloxane block has a molecular weight of 10-400. It is well settled that where prior art describes the components of a claimed compound or compositions in concentrations within or overlapping the claimed concentrations a prima facie case of obviousness is established. See MPEP 2144.05; *In re Harris*, 409, F.3d 1339, 1343, 74 USPQ2d 1951, 1953 (Fed. Cir 2005); *In*

re Peterson, 315 F.3d 1325, 1329, 65 USPQ 3d 1379, 1382 (Fed. Cir 1997); *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936-37 (CCPA 1990); *In re Malagari*, 499 F.2d 1297, 1303, 182 USPQ 549, 553 (CCPA 1974).

Response to Arguments

21. Applicant's arguments filed 3/1/2010 have been fully considered but they are not persuasive.
22. Applicant argues that Hoxmeier does not teach the reaction occur in an organic solvent, and instead teaches a solventless process.
23. Applicants argue that the process of Hoxmeier is further distinguished from the instant claims because the Applicants have not claimed or described a block copolymer or method of making a block copolymer. This is not persuasive.
24. It is noted that in several locations, Hoxmeier uses the phrase "solventless" in describing their invention (see Applicant's Remarks, pg. 5, filed 3/1/2010). However, understanding Hoxmeier to be solventless would not be accurate. Rather, the invention of Hoxmeier is directed to a system which does not use volatile hydrocarbon solvents. For example:
 - col. 1, ln. 25-26 - "which does not require the use of a volatile hydrocarbon solvent."
 - col. 2, ln. 9-12 - "It is preferable to use an organo alkali metal (such as sodium or potassium) compound in the molten phase or the non-volatile oil"
 - col. 2, ln. 32-34 - "Non-volatile processing oils such as SHELLFLEX® oil can also be used as the polymerization medium."

25. Taking the above in consideration with the citations provided by the Applicant, Hoxmeier can reasonably be read as substituting volatile hydrocarbon solvents with a reaction medium that is a molten polymer or a non-volatile oil. Thus, while the solvents of Hoxmeier are non-traditional, they do fall within the scope of an organic solvent.

26. Furthermore, Hoxmeier includes by reference the general method of making polyethylene-polysiloxane block copolymers with hydrocarbon solvents as disclosed in U.S. 5,618,903 (col. 2, ln. 42-46).

27. Furthermore, it is noted that in Example 1 of Hoxmeier, the hexamethylcyclotrisiloxane was added to the living polymer in a solution of cyclohexane (col. 4, ln. 20-34). Thus, even if the polyethylene wax used as a reaction medium for the living polymerization of the ethylene is not considered a solvent, the cyclohexane present on the addition of the cyclosiloxane would be. Because Hoxmeier gives only two examples, carried out substantially identically, it is presumed that the examples are according to the invention of Hoxmeier.

28. Thus, the weight of the evidence in Hoxmeier is directed to the use of a reaction medium that falls within the scope of the claimed "organic solvent".

29. It is noted that claim 40 recites "reacting a living polymer comprising unsaturated mer". Because the claim language uses the open transitional phrase "comprising" other monomers and blocks are not excluded from the scope of the claim. See MPEP 2111.03.

30. Furthermore, the final product of the instant invention could be termed a block polymer, with a block of the unsaturated monomer, followed by a block of siloxane units to arrive at an A-B block copolymer.

31. Therefore, Applicant's argument is not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ROBERT C. BOYLE whose telephone number is (571)270-7347. The examiner can normally be reached on Monday-Thursday, 9:00AM-5:00PM Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Robert C. Boyle/
Examiner, Art Unit 1796

/Vasu Jagannathan/
Supervisory Patent Examiner, Art Unit 1796